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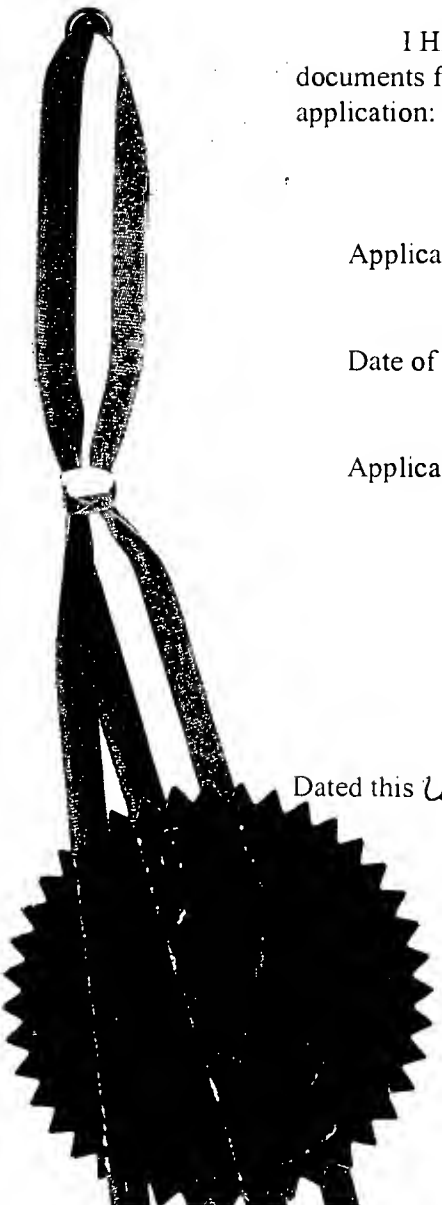
Application No. 990454

**CERTIFIED COPY OF
PRIORITY DOCUMENT**

Date of Filing 1 June 1999

Applicant MARKPORT LIMITED, an Irish company of Custom House Plaza 5, Harbourmaster Place, Dublin 1, Ireland.

Dated this 20 day of November 2001.



Colin

An officer authorised by the
Controller of Patents, Designs and Trademarks.

REQUEST FOR THE GRANT OF A PATENT

PATENTS ACT, 1992

The Applicant(s) named herein hereby request(s)

X the grant of a patent under Part II of the Act

_____ the grant of a short-term patent under Part III of the Act
on the basis of the information furnished hereunder.

1. Applicant(s)Name

Markport Limited

Address

Custom House Plaza 5
Harbourmaster place,
Dublin 1
Ireland

Description/Nationality

An Irish company

2. Title of Invention

"An Interface Module For Mobile Telecommunication System"

3. Declaration of Priority on basis of previously filed application(s) for same invention (Sections 25 & 26)Previous filing dateCountry in or for
which filedFiling No.4. Identification of Inventor(s)

Name(s) of person(s) believed
by Applicants(s) to be the inventor(s)

AITKEN, James of c/o Markport Limited, Custom House Plaza 5, Harbourmaster
Place, Dublin 1, Ireland

BOYDEN, Paul an Irish citizen of 133 Terenure Road West, Dublin 6w, Ireland

190454

5. Statement of right to be granted a patent (Section 17(2) (b))

The applicant derives the rights to the invention by virtue of a general Deed of Assignment dated 25/5/1999

6. Items accompanying this Request – tick as appropriate

- (i) ☒ prescribed filing fee (£100.00)
- (ii) ☒ specification containing a description and claims
☐ specification containing a description only
☒ Drawings referred to in description or claims
- (iii) ☐ An abstract
- (iv) ☐ Copy of previous application (s) whose priority is claimed
- (v) ☐ Translation of previous application whose priority is claimed
- (vi) ☒ Authorisation of Agent (this may be given at 8 below if this Request is signed by the Applicant (s))

7. Divisional Application (s)

The following information is applicable to the present application which is made under Section 24 –

Earlier Application No:

Filing Date:

8. Agent

The following is authorised to act as agent in all proceedings connected with the obtaining of a patent to which this request relates and in relation to any patent granted -

Name

John A. O'Brien & Associates

Address

The address recorded for the time being in the Register of Patent Agents, and currently Third Floor, Duncairn House, 14 Carysfort Avenue, Blackrock, Co. Dublin, Ireland.

9. Address for Service (if different from that at 8)

As above

Signed



John A. O'Brien & Associates

Date

May 31, 1999



990454

"An Interface Module For Mobile Telecommunication Systems"

Introduction

5 The invention is directed towards providing for access to databases on mobile telecommunication systems such as those which store mobile subscriber feature data.

At present, such data can be controlled using special feature codes from a mobile handset. However, the feature codes are complex to use and difficult to remember, and also use of
10 a mobile handset is required.

Statements of Invention

According to the invention, there is provided an interface module comprising means for
15 allowing client systems to read and write mobile subscriber feature data in a HLR.

In one embodiment, the module uses MAP operations over a signalling network.

Preferably, the module provides a CORBA-based client interface.
20

In another embodiment, the module comprises a Web page interface.

Preferably, the module comprises a VLR for interfacing with the HLR.

25 In another embodiment, the module comprises means for handling transactions in an atomic manner.

Preferably, the module comprises a Mobile Services Data Platform (MSDP) which provides multiple configuration capability.
30

In another embodiment, the module comprises at least two interfaces, one of which provides a backup.

5 In a further embodiment, the module allows configuration of MAP messages which may be passed.

Preferably, the module comprises means for maintaining a log of transactions resulting in changes to network data.

10 Detailed Description of the Invention

The invention will be more clearly understood from the following description of some embodiments thereof, given by way of example only with reference to the accompanying drawings in which:-

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Fig. 1 is a diagram showing the context in which an interface module of the invention is connected,

20

Fig. 2 is a high-level diagram showing signal transfers for interfacing, and

Fig. 3 is a diagram of a platform architecture for the interface module.

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Referring to the drawings, and initially to Fig. 1 a customer 1 is shown accessing a client system 2, which in turn accesses an interface module ("EasyStar") 3. The interface module 3 is in a PLMN 4 within which it access a HLR 5.

30

The module 3 provides a simple, CORBA-based interface over which client systems may manipulate subscriber feature data in any GSM HLR using MAP operations over the SS7 network. The module is generic in so far as it may be configured to handle any feature whether standard or proprietary, available in a subscribers profile. The module 3 uses

MAP operations, feature codes, and basic categories such as call forwarding and barring. The client system 2 provides the customer interfacing to present the features and their data in a form understood by the subscribers. Therefore, the module 3 essentially provides a conduit through which client systems may issue MAP or INAP operations
5 over the SS7 network.

In one example, the module 3 supports a Web page interface over which, after suitable authorisation, subscribers may manipulate their own features over the Internet. The interface 3 comprises a simple Web page module which may be used to control standard
10 features and allow users to build their own Web pages. The module 3 does not impose limitations on which features may be controlled and it is the responsibility of the client system to impose the necessary restrictions.

The module 3 uses MAP or INAP operations to interface with the HLR. It is therefore
15 able to inter-work with any HLR from any vendor.

For compatibility, the operator's HLR should permit VLR to use the feature and password control MAP operations for a subscriber, even if that subscriber is not
20 registered at the VLR.

The module 1 comprises an API interface which allows client systems to view the module as a pipe to the HLR. There is a one-to-one relationship between the API operations and the associated MAP operations. All transactions are atomic, involving one invocation and a response. No transaction requires more than one invocation. This
25 is illustrated in Fig. 2.

A CORBA based interface is used over the Internet Inter-Orb Protocol (IIOP). The methods provided by the interface are:

Logon to establish an association. The standard CORBA authorisation services are used to identify the client.

5 Logoff to explicitly end an association. If an association is inactive for a configurable period, EasyStar will automatically end it and the client will have to logon again (which, of course, it may do transparently to the user).

10 Invoke to issue one or more MAP operations. All operations will be performed, whether or not the others are successful. Though the operations will normally be performed sequentially, EasyStar may change the order if that is expedient. The result of an invoke will comprise an attribute indicating the number of unsuccessful operations and the set of results received from the HLR.

15 EasyStar restricts multiple operations in the same invoke to be for the same mobile number (MSISDN)

20 Although the module 3 does not impose restrictions on the features, it does authenticate its clients. Individual clients may be configured to be restricted to certain operations and to the ranges of numbers they may manipulate. The client systems may establish one or more associations with the module 3 by providing a user identifier.

25 The capabilities assigned to an EasyStar is client based on their permission include the following:

- The ranges of directory numbers (MSISDNs) that the client is allowed to manipulate. A range can be a block or, in order to cater for number portability, single numbers. In fact the process is two tier. Clients are assigned the right to

handle one or more groups of numbers (known as "markets"), which identify the permitted number ranges.

- The MAP operations that the client is permitted to issue. For example a client can be restricted to just interrogating supplementary service data without being able to change them.

Referring now to Fig. 3, the layered structure of the module 3 is illustrated. Fig. 3 comprises an application 10 residing on a generic VLR module 11, which in turn resides on a Mobile Services Data Platform (MSDP). In this embodiment, the operating system is a HP platform supporting HP OpenCall. The application 10 may co-exist on other applications on the MSDP.

The MSDP supports very high availability configurations and mated pairs. The module 3 may comprise two small systems, one providing a backup. The following features are provided.

- (a) All transactions are atomic and thus, providing a transaction was not being performed at the same time of the failure, an EasyStar client should be able to login into another EasyStar system and continue working without its users knowing.
- (b) If failure does occur during an update transaction, then the client system will need to perform appropriate recovery. The two simplest options are:
 - Repeat the transaction
 - Re-interrogate feature status and start again.
- (c) Apart from client authorisation and configuration data, no significant run-time data is maintained by EasyStar. This means that, provided a client is configured

on an EasyStar system, it can log-in and use it. However to facilitate operations and maintenance, EasyStar uses the MSDP distributed architecture capabilities to allow a single point of access for client oriented data, which are automatically distributed to the separate systems.

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Regarding operations and support, the module 1 is fully configurable to allow customisation to meeting individual operators needs.

The main aspects of application configuration are:

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- The MAP messages that may be passed and any validation that must be performed on them before relaying. This is done with a simple scripting technique that uses the operation and attributes names in the MAP ASN.1 specifications

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- Client system details, names, passwords and authorisation. This is performed using Java-based GUI screens.
- All aspects of SS7 connectivity, sub-system numbers, addressing techniques, etc.

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The module 3 also keeps a log of all transactions resulting in changes to network data i.e. all transactions which changes a client profile. Interfaces are provided for inspecting the on-line and for down-loading them to other operations support systems for analysing and/or archiving.

25 The following statistics of activity are maintained:-

Number of each type of API operation received,

Number of each MAP operation issued,

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Number of errors of each type encountered.

Counts are packaged up and written to a statistics log at configurable intervals such as 5 to 15 minutes.

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The invention is not limited to the embodiments described but may be varied in construction and detail.

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Claims

1. An interface module comprising means for allowing client systems to read and write mobile subscriber feature data in a HLR.
2. An interface module as claimed in claim 1, wherein the module uses MAP or INAP operations over a signalling network.
3. An interface module as claimed in claims 1 or 2, wherein the module provides a CORBA-based client interface.
4. An interface module as claimed in any preceding claim, wherein the module comprises a Web page interface.
5. An interface module as claimed in any preceding claim, wherein the module comprises a VLR for interfacing with the HLR.
6. An interface module as claimed in any preceding claim, wherein the module comprises means for handling transactions in an atomic manner.
7. An interface module as claimed in any preceding claim, wherein the module comprises a Mobile Services Data Platform (MSDP) which provides multiple configuration capability.
8. An interface module as claimed in any preceding claim, wherein the module comprises at least two interfaces, one of which provides a backup.
9. An interface module as claimed in claims 7 or 8, wherein the module allows configuration of MAP messages which may be passed.

10. An interface module as claimed in any preceding claim, wherein the module comprises means for maintaining a log of transactions resulting in changes to network data.
- 5 11. An interface module substantially as described with reference to the drawings.

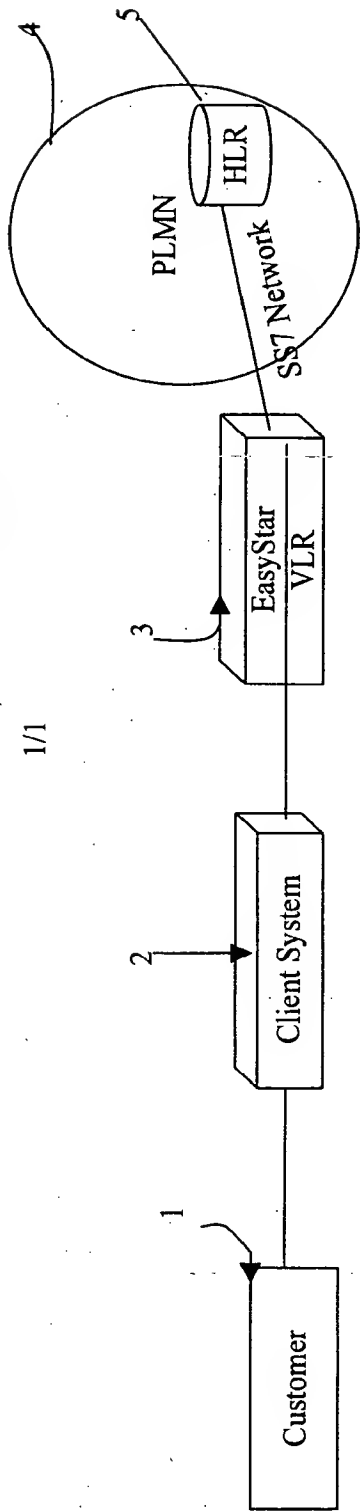


Fig. 1

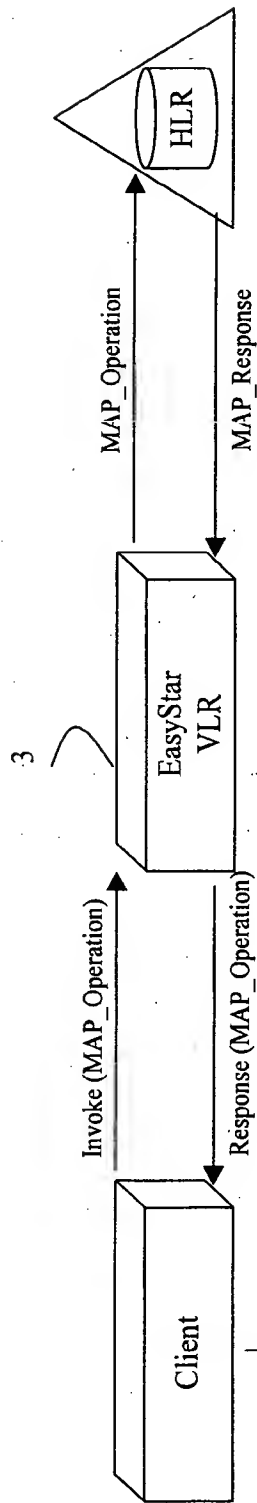


Fig. 2

10	EasyStar
11	Generic VLR Module
12	Mobile Services Data Platform
13	HP Open Call ®
14	HP-UX (Unix)

Fig. 3